THE UNIVERSITY OF TULSA
Division of Continuing Education
The Center for Environmental Research and Technology

Environmental Protection Agency's Program on Indoor Air Quality

Speaker:

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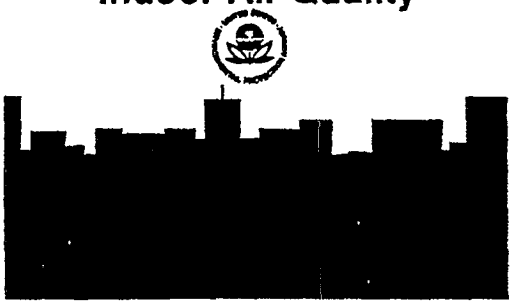
Indoor Air Quality



Indoor Air Quality

- The Problem
- The Solutions
- The Program

Indoor Air Quality:
The Problem

Why is Indoor Air Important?

- Indoor levels often higher than outdoors
  - 2-5 times higher for many pollutants
  - Up to 1000 times higher during and shortly after use
- People spend app. 90% of time indoors
- Significant short & long term health impacts
- Economic impacts in tens of billions of dollars per year

Indoor Air Quality

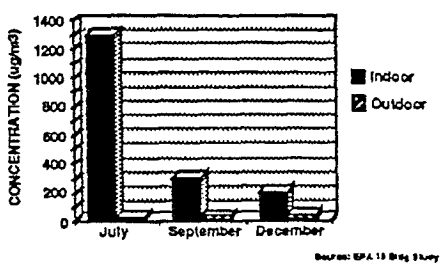
Long Term Risks

- Asbestos
- Radon
- ETS

Immediate Effects

- Building Related Illness
- Sick Building Syndrome

Total Organics in a New Office Building



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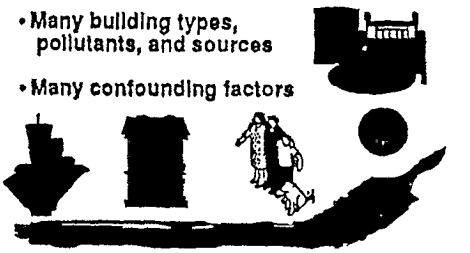
Comparing Risks to Set Environmental Priorities

- 1987 Comparative Risk Project: Indoor Air Ranked #4
- 1989 Regional Rankings Indoor Air Ranked #2
- 1990 Science Advisory Board Indoor Air Among Top 4

✓Indoor Air Quality is a Complex Problem

- Many building types, pollutants, and sources
- Many confounding factors



Pollutants and Pollutant Sources

Pollutant	Source(s)
Radon and radon progeny	Soil, well water some building materials
Environmental tobacco smoke (ETS)	Tobacco smoking
Biological contaminants (bacteria, viruses, fungi, mold spores, pollen, other biological material)	Outdoors, humans, animals, HVAC systems
Volatile organic compounds (VOCs)	Paints, stains, adhesives, dyes, solvents, caulks, cleaners, pesticides, building materials

✓ Pollutants and Pollutant Sources

Pollutant	Source(s)
Formaldehyde	ETS, UFR, particle board, plywood, furnishings, upholstery
Polycyclic aromatic hydrocarbons (PAHs)	ETS, kerosene heaters
Pesticides	Pesticide application indoors and outdoors
Asbestos	Asbestos cement, insulation, other building materials

Pollutants and Pollutant Sources

Pollutant	Source(s)
Combustion Gases	
• Carbon Monoxide (CO)	Combustion appliances, ETS, infiltrated exhaust
• Nitrogen Dioxide (NO_2)	Combustion appliances, ETS
• Sulfur Dioxide (SO_2)	Combustion of fuels containing sulfur (e.g. kerosene heaters)
Particles	Combustion appliances, ETS, personal activities (e.g. sprays, cooking aerosols)

✓ Factors Affecting Occupant Perception of Indoor Air Quality

- Chemical contaminants
- Biological contaminants
- Ventilation (outside air supply & air movement)
- Thermal comfort (temp / humidity)
- Odor
- Psycho-social factors
- Lighting / ergonomics / other factors

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Additional Complexities

- Limited scientific understanding of many health effects issues:
  - Mixtures
  - Low levels of pollutants
- Ventilation assessments complex

Indoor Air Quality: The Solutions

Indoor Air Quality Solutions

Hierarchy of IAQ Control Strategies

- Source Management
  - Lower emitting materials
  - Removal, encapsulation, time of use, etc.
- Ventilation
  - Dilution
  - Exhaust
  - Comfort
- Air Cleaning

Indoor Air QualitySolutions

Prevention

- Designate a responsible person
- Develop an IAQ profile:
  - Existing records
  - Walkthrough inspection
- Develop an IAQ management plan:
  - Assign staff responsibilities
  - Maintenance & operations
  - Occupant activities

Indoor Air Quality Solutions

Problem Solving

- Collect information on:
  - Occupant complaints
  - HVAC system
  - Pollutant sources & pathways
- Form & test hypotheses
- Design & implement mitigation strategies

Indoor Air Quality: The Program

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Federal Agencies Involved in Indoor Air Quality

Environmental Protection Agency (EPA)
Consumer Product Safety Commission (CPSC)
Department of Energy (DOE)
National Institute for Occupational Safety & Health (NIOSH)
Occupational Safety & Health Administration (OSHA)
General Services Administration (GSA)
Department of Transportation (DOT)
Department of Housing & Urban Development (HUD)
Department of Commerce (DOC)
Department of Defense (DOD)
National Aeronautics & Space Administration (NASA)
Plus approximately 8 other agencies

Federal Agencies Involved in Indoor Air Quality

Environmental Protection Agency (EPA)

- Broad research and information authority
- Statutes to control individual chemicals / pesticides
- Major programs to address asbestos, radon

Federal Agencies Involved in Indoor Air Quality

Consumer Product Safety Commission (Independent Agency)

- Consumer product regulations

Occupational Safety and Health Administration (Dept. of Labor)

- Worker health & safety regulations
- Primarily industrial workplaces

Federal Agencies Involved in Indoor Air Quality

National Institute of Occupational Safety & Health (Department of Health & Human Services)

- Building investigations
- Research
- Guidance

Federal Agencies Involved in Indoor Air Quality

Department of Energy (DOE)

- Energy related research

General Services Administration (GSA)

- Responsibility for Federal Bldgs

Department of Transportation (DOT)

- Airline cabin air quality, other transportation

plus app. 10 other Federal agencies

State Indoor Air Quality Programs

- Decentralized
- Some regulatory programs
- Require technical and information support

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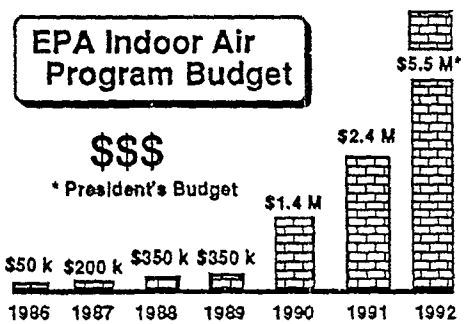
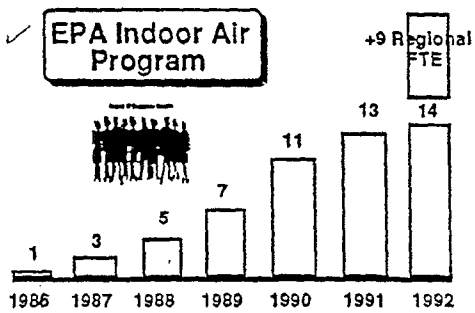
EPA and Indoor Air

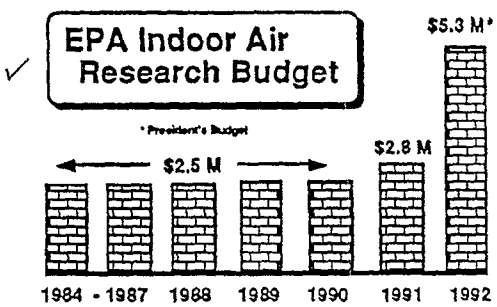
1970	Clean Air Act
70's/80s	Asbestos, formaldehyde
1984	Congressional research $$
1985	Radon Action Program
1986	Sara Title IV: 1st legislation on IAQ
1990	Senate bill passes
1991	New bills introduced

EPA Offices w/ IAQ Exposure Activities

- Office of Air and Radiation (indoor air, radon)
- Office of Research and Development (monitoring, health, and engineering labs)
- Office of Toxic Substances (asbestos, lead, formaldehyde, other toxic chemicals) -- to become a focal major point to assess toxic substances
- Office of Pesticide Programs
- Office of Drinking Water







Superfund Amendments and Reauthorization Act (SARA) Title IV

Key Elements:

- No regulatory authority
- Emphasis on research and information dissemination
- Limited resource authorizations

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Source: https://www.industrydocuments.ucsf.edu/docs/nmmm0000

EPA Indoor Air Program

5 Program Elements:

Policy Development

Buildings Program

Pollutant /Source Program

Intergovernmental Program

Public Information Program

EPA Indoor Air Program

5 Program Elements:

Policy Development

Buildings Program

Pollutant /Source Program

Intergovernmental Program

Public Information Program

Policy Development

Goals:

- Identify and fill information gaps for long term policy development
- Establish and implement near term operating principles

Policy Development

Report to Congress on Indoor Air Quality

- Summary of federal activities
- Status of IAQ knowledge
- Research needs
- 6 Recommendations:
  - research
  - guidance, information development/dissemination

Policy Development

Multiple Chemical Sensitivity Research Agenda

- NAS/NRC
- March 91 Workshop
- Identify current knowledge & research needs
- NOT intended to draw conclusions on MCS

Policy Development

Study of Indoor Allergens

- NAS/NRC
- 18 month project
- Identify current knowledge & research needs

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Policy Development

Indoor Air Quality Interdisciplinary Forum

- Extension of IAQ firms survey & credentialling project
- Intended to promote cross-fertilization across IAQ disciplines; and
- Enhance existing credentialling, continuing education, and curriculum development programs

Policy Development

FY 92-95 Large Building Study

- Need for baseline data
- Methods development / standardization
- Planning now underway

initiate study for baseline data (planning) 12 mo to get data
in & out of gov. to develop protocol HBI?
multi-year -

Present Policy Strategy

- Transfer what we know NOW about risk and risk reduction
- Take immediate steps to:

MINIMIZE HUMAN EXPOSURE TO INDOOR AIR CONTAMINANTS

Present Policy Strategy

- Stress building design, operation, and maintenance as most practical approach to exposure reduction
- Encourage voluntary industry efforts to reduce source emissions
- Improve TSCA/FIFRA pollutant specific programs

Pending Legislation S. 455 (Mitchell/Chafee)

- No regulatory authority
- $48.5 million/yr *authorized*
- Expanded research and research demonstrations
- Health advisories
- State grants
- National Response Plan
- NIOSH building investigation program
- Information Clearinghouse

Pending Legislation H.R. 1066 (Kennedy)

- Most provisions of Mitchell Bill
- Also proposes new regulatory programs:
  - Contaminant Emissions Product Labeling — only for prod that contain health risks
  - Ventilation Standards for Public and Commercial Buildings cfm 20 cfm records keeping
  - Workplace Indoor Air Quality Protection OSHA reevaluate - lack of data thus far

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Source: https://www.industrydocuments.ucsf.edu/docs/nmmm0000

Pending Legislation
H.R. 1066 (Kennedy)

Contaminant Emission Product Labeling

- EPA to establish standard test methods for emissions from sources that "pose significant adverse health effects"
- Affected industries to label products with emissions data

Pending Legislation
H.R. 1066 (Kennedy)

Contaminant Emission Product Labeling

Problems:

- Presupposes provable adverse health effects of common products
- Attempts to legislate simple fix to TSCA

Pending Legislation
H.R. 1066 (Kennedy)

Ventilation Standards for Public and Commercial Buildings

- Mandates minimum of 20 cfm/occupant in all new buildings (design & operation)
- Recordkeeping for all new and existing buildings
- OSHA to enforce
- EPA to evaluate need for pollutant-specific standards

Pending Legislation
H.R. 1066 (Kennedy)

Workplace Indoor Air Quality Protection

- OSHA to evaluate need for IAQ standards for the workplace

Pending Legislation

EPA/Administration Position

- Existing authorities sufficient
  - –TSCA performance should be enhanced, *not* replicated
- Resources for IAQ increasing
- Bills would disrupt current effort:
  - –Pollutant specific provisions would produce only controversy, *not* risk reduction
  - –Bills would shift emphasis away from building performance and key audiences and into process, reports and studies

EPA Indoor Air Program

5 Program Elements:

Policy Development

Buildings Program

Pollutant /Source Program

Intergovernmental Program

Public Information Program

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Source: https://www.industrydocuments.ucsf.edu/docs/nmmm0000

Public & Commercial Buildings

Building Managers' Prevention & Problem- Solving Guidance

- Joint EPA/NIOSH "self-help" guides
- External review completed
- Completion: Fall 1991

one guide

Public & Commercial Buildings

Architect & Engineers Introduction to IAQ

- Non-prescriptive information
- Entering outside review
- Completion: Early 1992

Schools

Introduction to IAQ for school facility managers

- Concise intro to school IAQ issues
- Completion: Mid 1992

Residential Buildings

Homebuilder's Guide to IAQ

- Basic IAQ design features
- Possible "upgrade" features
- Completion: early 1992

EPA Indoor Air Program

5 Program Elements:

Policy Development

Buildings Program

Pollutant /Source Program

Intergovernmental Program

Public Information Program

Pollutant/Source Program

Environmental Tobacco Smoke

- Health Effects of Passive Smoking: Lung Cancer in Adults and Respiratory Disorders in Children
- Guide to Workplace Smoking Policies
- SAB report April 18th
- Final documents: Fall 91

- Rec. changes to poister

Class A carcinogen

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Source: https://www.industrydocuments.ucsf.edu/docs/nmmm0000

Pollutant/Source Program

Why Environmental Tobacco Smoke?

- Represents significant gap in EPA chemical control program under TSCA
- Cigarettes are a strong source of particles indoors
- Demonstrable acute effects and a strong cancer case
- Not an integral component of building function (e.g. as compared to bldg materials & furnishings)

Pollutant/Source Program

ETS Policymaker's Guide

- Guidance on workplace smoking policies
- Theme: Prudent to minimize exposure
- Basis: 1986 Surgeon General, NRC reports; overall body of literature on ETS:
  - Sensory reactions and irritation effects
  - Lung cancer risk
- Completion: Fall 1991

Pollutant/Source Program

ETS Risk Assessment

(ORD Human Health Assessment Group)

- Purposes:
  1) To evaluate new ETS studies since 1986;
  2) To classify ETS according to EPA carcinogenicity guidelines; and
  3) To assess extent of risk associated with exposure to ETS (lung cancer; respiratory disorders in children)
- Completion: Fall 1991

Pollutant/Source Program

Carpet Policy Dialogue

- Goal to promote low cost/low impact TVOC emission reductions from carpet products:
  - -- carpet
  - -- adhesives
  - -- padding
- Standardized chamber test method

Pollutant/Source Program - short -

Physician's Guide to Indoor Air Quality

(American Lung Association)

- Intro to IAQ for primary care physicians
- Signs and symptoms, sources, solutions
- Completion date: Early 1992

EPA Indoor Air Program

5 Program Elements:

Policy Development

Buildings Program

Pollutant/ Source Program

Intergovernmental Program

Public Information Program

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Source: https://www.industrydocuments.ucsf.edu/docs/nmmm0000

Intergovernmental Program

Training &Tech Assistance

- "Live "training course for state and local government personnel
- "Self-paced" training module
  - Learning module
  - Reference manual
- Regional program development

be ready this summer

Intergovernmental Program

- Interagency Committee on Indoor Air Quality (CIAQ)
  - *Current Federal Activities*
- NATO/CCMS Pilot Study on Indoor Air

EPA Indoor Air Program

5 Program Elements:

Policy Development

Buildings Program

Pollutant /Source Program

Intergovernmental Program

Public Information Program

Public Information Program

The Inside Story ...
A Guide to Indoor Air Quality

Public Information Program

Highlights:

- *Directory of State IAQ Contacts*
- Fact Sheets ETS
- Pamphlet on Residential Air-Cleaners
- Information Clearinghouse - database

online this summer

Summary

- Sufficient evidence exists that indoor air pollution poses significant acute and chronic health risks;
- Complete risk characterization years away;
- Prudent to minimize human exposures through:
  - Building design & operation
  - More effective use of existing chemical-specific program authorities

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Source: https://www.industrydocuments.ucsf.edu/docs/nmmm0000